

IN THE CLAIMS:

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Please amend the claims as shown below. After amendment, the status of the claims will be as follows.

Claims 1 - 61 (cancelled)

62. (currently amended) A clamping apparatus for lifting a rectangular layer of items on a pallet comprising:

a frame;

four clamping arms pivotably mounted on the frame for pivoting with respect to the frame with a single degree of freedom and positioned on the frame so as to be able to grasp a rectangular layer of items on a pallet from four sides of the layer, each clamping arm including a contact portion for contacting a side of the layer to be lifted, each clamping arm defining a four-bar linkage which controls an angle of the contact portion with respect to the vertical as the clamping arm pivots with respect to the frame, the four-bar linkage of each clamping arm including a lever portion pivotably connected to the frame and to the contact portion of the clamping arm, and a rigid control rod for adjusting the angle of the contact portion with respect to the vertical extending alongside the lever portion and having an upper end pivotable with respect to the frame and a lower end pivotable with respect to the contact portion; and

a plurality of drive mechanisms connected to the clamping arms to pivot the clamping arms with respect to the frame.

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63. (previously presented) A clamping apparatus as claimed in claim 62 wherein the four-bar linkage comprises a parallel linkage which maintains the angle of the contact portion with respect to the vertical constant as the clamping arm pivots with respect to the frame.

Claims 64 - 74 (cancelled)

75. (currently amended) A clamping apparatus as claimed in claim ~~64~~ 62 wherein the control rod has an adjustable length.

76. (previously presented) A clamping apparatus as claimed in claim 75 wherein the length of the control rod can be adjusted by rotating a body of the control rod.

Claims 77 - 82 (cancelled)

83. (previously presented) A clamping apparatus for lifting a rectangular layer of items on a pallet comprising:

a frame;

a plurality of clamping arms pivotably mounted on the frame, each clamping arm including a lever portion pivotably mounted on the frame, a contact portion pivotably mounted on the lever portion for contacting a side of a rectangular layer of items on a pallet to be lifted, and a rigid adjustable-length rod extending alongside the lever portion and having a lower end pivotable with respect to the contact portion, a change in the

length of the rod changing an angle of the contact portion with respect to the lever portion; and

at least one drive mechanism connected to one of the lever portions to pivot the lever portion with respect to the frame.

Claims 84 - 89 (cancelled)

90. (previously presented) A method of using a clamping apparatus comprising grasping a rectangular layer of items disposed on a pallet from four sides of the layer with the clamping apparatus of claim 62 and lifting the layer off the pallet.

91. (previously presented) A method as claimed in claim 90 wherein the layer comprises a layer of boxes of food, and each contact portion has a surface which contacts a side of the layer and is approximately parallel to the side of the layer.

92. (currently amended) A method ~~as claimed in claim 90~~ of using a clamping apparatus having a frame, four clamping arms pivotably mounted on the frame for pivoting with respect to the frame with a single degree of freedom and positioned on the frame so as to be able to grasp a rectangular layer of items on a pallet from four sides of the layer, each clamping arm including a contact portion for contacting a side of the layer to be lifted, each clamping arm defining a four-bar linkage which controls an angle of the contact portion with respect to the

vertical as the clamping arm pivots with respect to the frame,
and a plurality of drive mechanisms connected to the clamping
arms to pivot the clamping arms with respect to the frame, the
method comprising grasping a rectangular layer of items disposed
on a pallet from four sides of the layer with the clamping
apparatus and lifting the layer off the pallet, wherein the layer
comprises cans of beverages, and each contact portion has a
surface which contacts a side of the layer and is sloped
downwards towards the side of the layer at an angle of 2 - 6°
with respect to the side of the layer.

93. (previously presented) A clamping apparatus as claimed
in claim 62 wherein each contact portion has a substantially
planar surface for contacting a side surface of a layer of items
on a pallet extending between an upper and a lower edge of the
contact portion.

94. (currently amended) A clamping apparatus as claimed in
claim 64 62, wherein:

the lever portion is pivotably supported by the frame for
pivoting with a single degree of freedom about a pivot point
which is fixed with respect to the frame;

the control rod is pivotably supported by the frame for
pivoting with a single degree of freedom about a pivot point
which is fixed with respect to the frame; and

the contact portion includes an elongated rigid plate-shaped
panel having a front upright surface for opposing a side of a

layer of objects to be lifted and a plurality of mounting lugs secured to a back upright surface of the panel and pivotably connected to a lower end of the lever portion and a lower end of the control rod.

95. (currently amended) A clamping apparatus as claimed in claim 62 wherein ~~for grasping a rectangular layer of items disposed on a pallet comprising:~~

~~a frame;~~

~~a pair of opposing clamping arms pivotably mounted on the frame for pivoting with respect to the frame with a single degree of freedom, each clamping arm including a contact portion pivotably disposed at a lower end of the clamping arm for contacting a side surface of a rectangular layer of items, the contact portion having an upper edge, a lower edge, and a substantially planar contact surface extending between the upper and lower edges for contact with a side surface of a layer of items, the contact portions of the opposing arms being~~ are ~~capable of being spaced from each other by at least 28 inches to enable the clamping apparatus to grasp a layer measuring at least 28 inches on a side, each clamping arm defining a four bar linkage which controls an angle of the contact portion with respect to the vertical as the clamping arm pivots with respect to the frame, and~~

~~at least one drive mechanism connected to one of the clamping arms to pivot the one of the clamping arms with respect to the frame.~~

96. (currently amended) A clamping apparatus as claimed in claim 62 wherein ~~for lifting a rectangular layer of items from a pallet comprising:~~

~~a frame;~~

the four clamping arms comprise two pairs of opposing clamping arms ~~pivotably mounted on the frame for pivoting with respect to the frame with a single degree of freedom and positioned on the frame so as to be able to grasp a rectangular layer of items on a pallet from four sides of the layer, each clamping arm including a contact portion for contacting a layer to be lifted, and~~

~~a plurality of drive mechanisms connected to the clamping arms to pivot the clamping arms with respect to the frame; and~~

wherein for each pair of opposing clamping arms, a separation between the contact portions of the clamping arms of the pair can be made at least 28 inches and can change by at least 4 inches due to pivoting of at least one of the clamping arms of the pair relative to the frame with an angle with respect to the vertical of each contact portion of the pair changing by no more than 2 degrees when the contact portions of the pair are not contacting a layer of items to be lifted.

97. (currently amended) A clamping apparatus as claimed in claim 96 wherein for each pair of opposing clamping arms, a separation between the contact portions of the clamping arms of the pair can change by at least 4 inches due to pivoting of at least one of the clamping arms of the pair relative to the frame

with an angle with respect to the vertical of each contact portion of the pair changing by no more than 1 degree when the contact portions of the pair are not contacting a layer of items to be lifted.

98. (currently amended) A clamping apparatus as claimed in claim 96 wherein for each pair of opposing clamping arms, a separation between the contact portions of the clamping arms of the pair can change by at least 4 inches due to pivoting of at least one of the clamping arms of the pair relative to the frame with an angle with respect to the vertical of each contact portion of the pair changing by no more than 0.5 degrees when the contact portions of the pair are not contacting a layer of items to be lifted.

99. (currently amended) A clamping apparatus as claimed in claim 96 wherein for each pair of opposing clamping arms, a separation between the contact portions of the clamping arms of the pair can change by at least 8 inches due to pivoting of at least one of the clamping arms of the pair relative to the frame with an angle with respect to the vertical of each contact portion of the pair changing by no more than 2 degrees when the contact portions of the pair are not contacting a layer of items to be lifted.

100. (currently amended) A clamping apparatus as claimed in claim 96 wherein for each pair of opposing clamping arms, a

separation between the contact portions of the clamping arms of the pair can change by at least 10 inches due to pivoting of at least one of the clamping arms of the pair relative to the frame with an angle with respect to the vertical of each contact portion of the pair changing by no more than 2 degrees when the contact portions of the pair are not contacting a layer of items to be lifted.

101. (previously presented) A clamping apparatus as claimed in claim 96 wherein the angle with respect to the vertical of the contact portion of any of the clamping arms varies by at most 2 degrees as a lower end of the contact portion travels by a horizontal distance of at least 6 inches as the clamping arm pivots with respect to the frame when the contact portion is not contacting a layer of items to be lifted.

102. (previously presented) A clamping apparatus as claimed in claim 96 wherein the angle with respect to the vertical of the contact portion of any of the clamping arms varies by at most 2 degrees as a lower end of the contact portion travels by a horizontal distance of at least 8 inches as the clamping arm pivots with respect to the frame when the contact portion is not contacting a layer of items to be lifted.

103. (currently amended) A clamping apparatus ~~as claimed in claim 62 wherein the four bar linkage defined by each clamping arm~~ for lifting a rectangular layer of items on a pallet

comprising:

a frame;

four clamping arms pivotably mounted on the frame for pivoting with respect to the frame with a single degree of freedom and positioned on the frame so as to be able to grasp a rectangular layer of items on a pallet from four sides of the layer, each clamping arm including a contact portion for contacting a side of the layer to be lifted, each clamping arm defining a four-bar linkage which controls an angle of the contact portion with respect to the vertical as the clamping arm pivots with respect to the frame and which includes an adjustable-length portion which can be adjusted in length to adjust the angle of the contact portion with respect to the vertical; and

a plurality of drive mechanisms connected to the clamping arms to pivot the clamping arms with respect to the frame.

104. (currently amended) A clamping apparatus as claimed in claim ~~64~~ 62 wherein the lever portion and the control rod of each clamping arm move in parallel planes which are spaced from each when the clamping arm pivots with respect to the frame.

105. (currently amended) A clamping apparatus as claimed in claim ~~64~~ 62 wherein the control rod of each clamping arm is pivotable about a first axis with respect to the frame and about a second axis with respect to the contact portion, the first and second axes being parallel to each other and spaced from each

other in a lengthwise direction of the control rod, and it is possible to draw a line which is parallel to the first and second axes and passes through the control rod and the lever portion of the clamping arm.

106. (currently amended) A clamping apparatus as claimed in claim ~~64~~ 62 wherein the lever portion extends above the frame, and each drive mechanism is disposed above the frame and is pivotably connected to the one of the lever portions above the frame.

107. (currently amended) A clamping apparatus as claimed in claim 62 wherein the four-bar linkage of each clamping arm includes a lever portion having upper and lower axes of pivoting and a rigid control arm extending alongside the lever portion and having upper and lower axes of pivoting, and wherein a plane which contains the lower axis of pivoting of the lever portion and the lower axis of pivoting of the control rod passes through a region of the contact portion which contacts a side of the layer to be lifted.